

of the thermic evolution of the globe," or that "*The fact of being conscious* does not intervene in the slightest degree in directing vital movements." Yet when we were conscious of this sentence we turned back several pages and re-read the preface, where the editor takes an optimistic view of mechanistic theories.

The author has full faith in the theory of *epiphenomenal* consciousness; it is a negligible shadow. He prefers to keep to the purely objective, e.g. the mechanism of colloids and the polarities of the cell. He is very strong on bipolarity. "The living cell is a bipolar apparatus, since it needs a cytoplasm and a nucleus." "In each bipolar element of protoplasm there is a male pole and a female pole." "Maturation is explained by the disappearance in cytoplasm and nucleus of all elements of the *sex opposed* to that of the mature element finally obtained." "Fecundation is the operation in which the spermatozoid, introduced by sexual attraction into the ovule, completes by means of its male poles the female poles of the ovule's elements, which are incomplete." "Assimilation is a bipolar phenomenon," and "alternating generation is also related with the bipolarity of the living elements." All this is "in the light of new knowledge," as is also the conclusion that "strictly speaking there is never any hereditary transmission except of acquired characters." The author corrects some of the errors of Claude Bernard, Darwin, and Weismann.

The book has been translated by Stoddard Dewey, and it is just possible that the original may have suffered a little. "If the hen fabricates the egg, the egg in its turn will fabricate the hen. We shall not therefore be astonished when we come to verify the marvellous phenomenon which governs the entire evolution of living beings: the heredity of acquired characters." "Lichens result from the association of seaweed and mushrooms." This lacks precision. "The embryology of an animal reproduces its genealogy." This lacks elegance. Speaking of crabs and lobsters, he says, "All variation, all modification is limited in such animals to this phenomenon of moulting." This lacks clearness.

J. A. T.

ZOOLOGY OF THE INDIAN OCEAN.

- (1) *The Fauna and Geography of the Maldivé and Laccadive Archipelagoes*. By J. Stanley Gardiner. Vol. ii. Part iv. and Supplements i. and ii., with index. Pp. 807-1079; 34 plates and figures in the text. (Cambridge: University Press, 1905 and 1906.)
- (2) *An Account of the Alcyonarians collected by the Royal Indian Marine Survey Ship "Investigator" in the Indian Ocean*. I. *The Alcyonarians of the Deep Sea*. By J. Arthur Thomson and W. D. Henderson. Pp. xvi+132; 10 plates, with colours. (Calcutta: The Indian Museum, 1906.)

THE memoirs contained in the above-named publications belong, if taken alone, to that large class of scientific papers which are commonly said

to be "of interest only to specialists," but in reality they betoken much more than this, since they denote a great activity in the investigation of the biological problems presented by the Indian Ocean. Far from overlapping, they are complementary to each other and to a third piece of contemporary work which does not fall within the scope of this notice—the Ceylon pearl-oyster report.

The research conducted by Mr. Stanley Gardiner upon the bionomical conditions or "biocenosis" of the Maldivé and Laccadive Archipelagoes, the earlier parts of which have been already reviewed in *NATURE*, is now brought to a close with the completion of the second volume, and, as Mr. Gardiner points out in his concluding remarks, the whole report contains fifty-four separate papers by thirty-two different authors. It is not easy to estimate the value of this unique work, which will remain indispensable to all who are interested in Indian marine zoology and in coral reefs. Perhaps the best tribute that can be paid to it, as a whole, is conveyed in that accorded to one portion of it by Prof. H. Coutière, the author of a report in vol. ii., part iv., upon the *Alpheidæ*, a family of Crustacea frequenting coral reefs and other suitable localities in the tropics:—

"La collection comprend 76 espèces et variétés, soit près de la moitié des formes actuellement connues d'*Alpheidæ*, et, parmi ces formes, 48 sont nouvelles. Aucune expédition n'a jamais atteint, même de loin, un semblable résultat. Si la localité choisie s'est montrée exceptionnellement riche, il faut aussi que son exploration ait été conduite avec une méthode et une science de la recherche des espèces marines qu'on ne saurait trop mettre en relief."

Every naturalist who has worked along shores where corals grow is familiar with some members of the family *Alpheidæ*, for which a satisfactory English equivalent seems not to have been invented. These crustacea are so remarkable that a common expression calculated to convey some idea of their properties is to be desired, and the name of trigger shrimps may be suggested. Upon placing them in a glass jar, one is likely to be startled by a sudden report, often so loud as apparently to threaten the fracture of the vessel. The noise is made by the snapping of one of their pincers of peculiar construction.

Although mainly systematic, Prof. Coutière's memoir will be welcomed by those who take an interest in the forms of animal life, not only because of his method of treatment, but especially on account of the admirably clear illustrations, which are reproduced from the author's drawings on eighteen plates, besides text-figures. These are models of what such illustrations should be, and one shudders to think of the paper without them. There is something wrong with Figs. 127 and 128 on pp. 855-6, the letters of the former not corresponding with the description, and the number of joints in the shaft of the outer antennular flagellum of male and female respectively not coinciding with the statement in the text—small blemishes of no account to the specialist, who can endure much. This work does not include a bibliography, and such references as are given are

not always to the point, *e.g.* *Ann. des Sc.* (6), 1899; the series should be (8) and the volume ix.

The same number (vol. ii., part iv.) contains the third instalment of Prof. Hickson's report on the Alcyonaria of the Maldives, with descriptions of fifteen (including two Briareidæ described previously) species of Gorgonacea and one Pennatulid. The depths at which the material was obtained ranged from 0-43 fathoms, generally between 20 and 30 fathoms; two specimens of the Pennatulid (*Pennatula murrayi*) were taken at 43 fathoms in the Suvadiva Lagoon. A general feature of many of the sublittoral Alcyonaria is their extreme variability.

Other papers to which space does not permit us to do justice beyond mentioning them are by Major Alcock on Paguridæ (hermit-crabs), recording twenty-six species, of which nine are new to the Indian Ocean, five new to science; Mr. L. A. Borradaile on Hydroids, twenty-three species; Mr. A. E. Shipley on two parasites; and Mr. W. L. Distant enumerates twenty species of Rhynchota.

The first supplement contains reports by Messrs. A. O. Walker (Amphipoda), J. Stanley Gardiner (Madreporaria), E. T. Browne (Scyphomedusæ), D. Sharp (Coleoptera), W. E. Hoyle (Cephalopoda), and R. Norris Wolfenden (Copepoda). Dr. Hoyle describes a rare squid, *Ancistrochirus lesueuri*, which has luminous organs; one specimen only, the second on record, was found floating dead off one of the atolls. Dr. Wolfenden, whose paper is illustrated by folding plates, compares the oceanic copepods of the Indian Ocean with those of the Atlantic, an intermixture of species between these two great oceans being hindered by the water barrier formed by the Agulhas Current; the author also points to an extraordinary difference between the Copepod fauna of the Maldivian Group and that of the Gulf of Manaar, owing to the paucity of littoral forms in the former area.

The second supplement contains an article by Mr. R. I. Pocock (Myriopoda), an excellent systematic index, a subject-index, and Mr. Stanley Gardiner's concluding remarks. From his notes on the habits and distribution of the land animals, we learn that the mammals of the Maldives are three, the fruit bat or flying fox, *Pteropus medius* (not found in Minikoi), the musk shrew, *Crocidura murina*, and the rat, *Mus rattus*; the absence of insectivorous bats is noted as a singular deficiency. The study of the land fauna has confirmed his conclusion, previously based on geological grounds, "that the Maldives and Laccadives are recent lands."

As is known, Mr. Gardiner has crowned his labours in the Maldives by another expedition to the western part of the Indian Ocean, and when these results are made known the importance of his individual contribution to Indian oceanography will doubtless be fully appreciated.

The sumptuous monograph of the Indian Alcyonarians of the deep sea, by Prof. J. A. Thomson and Mr. W. D. Henderson, is a revelation of a wealth of new forms depicted in a manner which, for this class of illustration, is beyond praise. The

authors are alive to the æsthetic possibilities of their subjects, and although these are to some extent prejudiced by inevitable *post-mortem* changes, enough remains to delight the eye and attest the beauty that is hidden in the depths of the sea. Of the eighty-six species included in the collection, sixty-one are new; only nine belong to the Alcyonacea (leathery corals, chiefly shallow-water forms); eight of these are new, and two of them are made the types of new genera. There are forty-one species of Gorgonacea ("sea-fans") and twenty-eight species of Pennatulacea ("sea-pens" or "sea-feathers"), thus displaying a very great contrast with the shallow-water fauna of the Maldives. Two genera, *Symphodium* of the Stolonifera and *Umbellula* of the Pennatulacea, contain a multiplicity of specific forms which the authors admit may be only mutations. In view of this possibility, it is hard to accept so many names on an equal footing with those of undoubted and striking types.

Several comparative tables of the species of various genera are introduced in the course of the work, and these should prove of great service to future investigators. This method of tabulation is the right one, and is capable of improvement until a degree of perfection is attained. In written descriptions it happens frequently that the most obvious distinction between allied species is a difference of verbiage. Such banalities can be eliminated from tables; thus it is not much to learn that whereas the axis of *Umbellula durissima* is "nearly cylindrical," that of *Umbellula dura* is "almost cylindrical." The quotation of an isolated example of this kind is not meant to detract in any way from the total value of the tables.

A special property of many deep-sea Alcyonarians is their viviparity. The authors have found embryos in eight different species belonging to the three principal sections, Alcyonacea, Gorgonacea, and Pennatulacea. A full bibliography completes the present monograph, and one dealing with the littoral forms is promised later.

MEDICAL MEDITATIONS.

Principia Therapeutica. By Dr. Harrington Sainsbury. Pp. xi+244. (London: Methuen and Co., n.d.) Price 7s. 6d. net.

IN the biological sphere, to attain by means of scientific analysis to generalisations of such a breadth as to justify the term of "*Principia*" is an arduous task, even for generations of men, and is one which is far beyond us at present. The attainment of principles can only be by the long and fallible ways of observation, verified by the experimental method; and—in medicine at any rate—we can claim to have surveyed and mapped out no very wide areas as yet. Now if this be true of pathology, of therapeutics it is grievously truer, although on the lines of pharmacology much "triangulation" is now going forward. It is almost needless to guard these remarks by adding that no one probably is more aware of these limits of our knowledge than the